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Experiment
2. Context-Dependent Memory, and Godden
and Baddeley (1975)
3. Comparison of Three Different Types of Treatment
for Adolescent Anorexia Nervosa: Evaluation
of a Randomised Controlled Trial

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WHAT REALLY HAPPENED: THE ROBBERS' CAVE EXPERIMENT

INTRODUCTION

The Robbers' Cave experiment (1)(2) (Sherif et al 1954)(3)(4)(5) was part of the Intergroup Relations Project at the University of Oklahoma, USA. It was a large-scale field experiment (6) because the researchers wanted to study behaviour "in terms of actualities of events in group relations as they exist in everyday life" (Sherif 1954).

In other words, not in the artificial environment of the laboratory. Such research was "plagued with serious questions of validity" (Sherif 1954)(7).

With the field experiment, the "techniques of data collection were adapted to the flow of interaction rather than cluttering or chopping off interaction for the convenience of the experimenter" (Sherif 1954) as in laboratory experiments (8).

BACKGROUND AND AIMS

The aim of the study was "to trace over a time period the formation and functioning of negative and positive attitudes of one group toward another group and its members" (Sherif et al 1954 p27). A number of hypotheses were tested (9).

The researchers defined a group:

as a social unit (i) which consists of a number of individuals who, at a given time, stand in more or less definite interdependent status and role relations to one another and (ii) which explicitly or implicitly possesses a set of values or norms of its own regulating the behaviour of individual members, at least in matters of consequence to the group (Sherif et al 1954 pp28-29).

METHODOLOGY

The study took place in summer 1954 (three weeks in late June and early July), and involved three stages:

Stage 1 - The creation of in-groups (10) with group norms and hierarchies of members;

Stage 2 - The production of intergroup tension as the two groups are in competition with each other;

Stage 3 - The reduction of intergroup tension by the use of superordinate goals which can only be achieved if the groups work together.

The researchers collected the data as staff members of the camp (participant observation) (11), and instructed not to interfere as much as possible bearing in mind the safety, health and wellbeing of the boys.

The participants were twenty-two (12)(13) 11 and 12 year-old boys (14) from middle-class, Protestant US families with no social problems. The choice of participants was based upon interviews with the boys' family, teachers and school officials, as well as observation in classes and the playground, and data from personality tests and school and medical records.

None of the boys was aware that they were part of an experiment. They believed it to be a typical summer camp as attended by US children (15). During the period of the experiment, parents were asked not to visit the boys.

Stage 1 (5-6 days) Experimental ingroup formation

The two groups were separate from the beginning arriving in different buses on different days (19th and 20th June 1954)(16). They were given tasks to build their cohesion. The boys named themselves the "Rattlers" and the "Eagles".

Stage 2 (4-6 days) Intergroup relations: friction phase

The two groups were now in competition through a tournament of events (eg tug-of-war; baseball) with rewards for the winning group. Also situations of frustration were created which appeared to be caused by the other group.

Stage 3 (6-7 days) Intergroup relations: integration phase

Situations were created by the researchers that required co-operation between the two groups in order to obtain common goals: breakdown of the water supply to the camp, and the truck not starting when everybody in town (and hungry).

FINDINGS

Stage 1

In-groups formed with their own norms, and pattern of leader-follower relations:

Certain places and objects important in group activities were incorporated as 'ours'. Ways of

doing things, of meeting problems, of behaving under certain conditions were standardized, permitting variation only within limits. Beyond the limits of the group norms, behaviour was subject to group sanctions, which ranged from ridicule, through ignoring the offender and his behaviour, to threats, and occasionally to physical chastisement (Sherif et al 1961 p206).

The strength of in-group favouritism was shown in overestimation of in-group members' performance, particularly of high status boys, in tasks like throwing darts at a target with no bullseye.

Stage 2

When the groups were in competition, two processes occurred. Firstly, there was a strengthening of in-group solidarity: "Psychologically, other people did not count as far as they were concerned" (Sherif et al 1961 p207). Even when the boys visited a public beach, they remained in their own groups.

At the same time, hostility towards the out-group increased. During this stage, less than 10% of friendship choices were from the out-group. In stage 3, this rose to around one-third (Sherif 1956)(table 1).

| <u>Group</u> | <u>Rattlers</u> | | <u>Eagles</u> | |
|--------------|-----------------|----------------|----------------|----------------|
| End of: | <u>Stage 2</u> | <u>Stage 3</u> | <u>Stage 2</u> | <u>Stage 3</u> |
| In-group | 93.6 | 63.6 | 92.5 | 76.8 |
| Out-group | 6.4 | 36.4 | 7.5 | 23.3 |

(After Sherif et al 1954)

Table 1 - Friendship choices (%) at end of stages 2 and 3 of the experiment.

Ratings of all members of the out-group as "cheats and sneaks" was around two-thirds in stage 2, and much less in stage 3 of the experiment (table 2).

The conflict was so great that after a tournament defeat the Eagles burned the banner of the Rattlers, and latter tried to reciprocate the next day leading to common bouts of name-calling, scuffles, and raids of the out-group's bunkhouse (Sherif 1956).

| <u>Group</u> | <u>Eagles</u> | | <u>Rattlers</u> | |
|-------------------|----------------|----------------|-----------------|----------------|
| End of: | <u>Stage 2</u> | <u>Stage 3</u> | <u>Stage 2</u> | <u>Stage 3</u> |
| Most unfavourable | 36.5 | 5.6 | 21.2 | 1.5 |
| Most favourable | 5.8 | 32.1 | 15.0 | 57.6 |

(After Sherif et al 1954)

Table 2 - Ratings (%) of out-groups on five point scale.

Stage 3

Contact between the two groups (eg eating in the same room) did not reduce friction. Contact initially, in fact, increased antagonism. They threw paper and food at each other during dinner. "An Eagle bumped by a Rattler was admonished by his fellow Eagles to brush 'the dirt' off his clothes" (Sherif 1956).

It was only the introduction of superordinate goals that reduced conflict and hostility (17). When the water supply "failed", the boys worked together to find the fault on a mile long pipe, and when the truck "failed" to start, they pushed it until it did. The hostility was not immediately dispelled, but slowly it was reduced through the acts of co-operation.

For example, "a Rattler whom the Eagles disliked for his sharp tongue and skill in defeating them became a 'good egg'" (Sherif 1956). Favourable attitudes towards the out-group and friendships developed (tables 1 and 2).

Over the period of the experiment, the researchers had created in-groups, produced conflict with the out-group, and reduced that conflict with co-operation (18).

CONCLUSION

The key elements in intergroup conflict are a strong group identity, and direct competition between groups over scarce resources. However, this was subsequently challenged by the Social Identity Theory (Tajfel and Turner 1979)(19).

EVALUATIVE FOOTNOTES

1. Robbers' Cave State Park is in Oklahoma near a famous hideaway of Jesse James and his gang.

It is a densely wooded area in the Sans Bois Mountains of south-eastern Oklahoma about seven miles

north of Wilburton. The Boy Scout of America camp in the State Park was made available for the study over its three weeks (Sherif et al 1954).

2. Two earlier versions (1949 and 1953) had been tried by the researchers. In 1949 (Sherif and Sherif 1953), in the hills of north Connecticut, in-groups were formed and tension produced between them before it ended. While in 1953 (Sherif et al 1955) only in-groups were formed. Sherif (1956) gave a composite of findings from all three experiments.

3. Muzafer Sherif, who led the project, had worked on small group behaviour for a number of years including conformity experiments (Sherif 1936).

4. Sherif et al (1961) is the second edition with two added chapters. A copy is available at (<http://psychclassics.yorku.ca/Sherif>) which includes the 1954 preface.

5. See also Sherif and Sherif (1953), Sherif et al (1955), and Sherif (1956).

6. A field experiment is an experiment that takes place in natural setting. It attempts to maintain all the control and rigour of the experimental method, but outside the laboratory. The experimenter goes to the participants, who may not know they are involved in some cases.

| <u>Strengths</u> | <u>Weaknesses</u> |
|--|---|
| 1. Natural setting used ie high ecological validity. | 1. Less control over variables and participants than laboratory experiment. |
| 2. Certain topics not possible to study in laboratory environment. | 2. Replication can be difficult. |

Table 3 - Main strengths and weaknesses of the field experiment.

7. Validity refers to whether the study measures what it claims to measure. In this case, ecological validity, is whether the results are applicable to real-life settings.

8. Sherif et al (1954) were very aware of criticisms of the field experiment and countered them:

- i) Choice of an isolated site for the experiment to avoid interference from "outside" factors;
- ii) Acceptance that it was impossible to observe all

behaviour, so focusing only on certain things;

iii) Fear of selectivity in observation overcome by independent observers, and the use of a combination of techniques (experiments, questionnaires, and observations).

9. Hypothesis testing is a key characteristic of an experiment. The researchers make a prediction about what they expected to happen and the data either supports this or not: eg "The course of relations between two groups which are in a state of competition and frustration will tend to produce an increase in in-group solidarity" (Sherif et al 1954).

10. In-group refers to the individual's own group, and out-group(s) refer to "those social units of which he is not a part psychologically or to which he does not relate himself" (sic)(Sherif et al 1954 p29). Intra-group relations are those between members of the same group.

11. Participant observation involves the researcher being part of the group they are observing, and observing from within the group. Their identity as a researcher is hidden from the participants.

| <u>Strengths</u> | <u>Weaknesses</u> |
|--|--|
| 1. Gain inside information as a member of the group. 2. Participants behave normally as they do not know they are being observed. | 1. Researcher's presence may influence the behaviour of the group unknowingly. 2. Ethics of deceiving participants who do not researcher's real identity and purpose. |

Table 4 - Main strengths and weaknesses of participation observation.

12. Two hundred potential participants were found initially from observation at school, and this was reduced after interviews with family etc (Sherif et al 1954).

13. Two boys left the study due to homesickness.

14. Small sample size, only boys and from a limited social background in the USA. It was a purposive sample which means that the researchers chose individuals to suit their study, but the participants are not necessarily representative of the whole population. This will limit the generalisability of the findings to a

wider population.

Similar findings to Sherif et al (1954) come from a study in Russia at Pioneer youth camp (Andreeva 1984). A replication in Lebanon (Diab 1970) had to stop after stage 2 because the intergroup hostility was so great. Tyerman and Spencer (1983), in the UK, used scout groups who knew each other, and intergroup conflict did not occur.

15. There are ethical concerns about the deception of the boys, and the risk of harm from the study. This is partly overcome because the parents gave their consent by sending the boys to the summer camp (and paying the fees - \$25).

16. In the first two experiments, the boys were allowed to mix and form their own friendships while doing typical summer camp activities before the experimental manipulation began. After forming friendships, the boys were deliberately separated, which has ethical implications.

17. Working together on common goals does reduce intergroup conflict, but there are factors involved: eg co-operation leading to failure does not reduce conflict (Brown 1988).

18. This work became formalised as the "realistic group conflict theory" (Sherif and Sherif 1969) because a "real conflict of group interests causes intergroup conflict" (Campbell 1965 p287).

17. More details of Tajfel's work in the last issue of "Psychology Information for Students" (Brewer 2007).

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Kevin Brewer

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CONTEXT-DEPENDENT MEMORY, AND GODDEN AND BADDELEY (1975)

BEFORE GODDEN AND BADDELEY (1975)

Context-dependent memory is the idea that material learnt in one environment is best recalled in that same environment. Godden and Baddeley's (1975) study took place in a situation of limited previous research which was divided about the existence of a context-dependent memory effect.

Variations in study design had also been tried. Strand (1970), for example, asked participants to have a drink of water from a drinking fountain in the corridor in between learning and recall in the same room. Thus recall was no better than learning in one room and recall in another. Strand suggested that it was the disruption of moving that reduces recall in context-dependent memory.

Other research had tested interference on memory in the same and different environments. Participants learned two similar lists of words, one after another, either in the same room or one list per room. The learning of the second list reduces recall of the first list (retroactive interference). When the lists were learned in separate rooms, recall was better than the same room (Bilodeau and Schlosberg 1951).

Previous research had also tried unusual environments. For example, Dallett and Wilcox (1968) used a box with flashing lights placed over the head of participants as one of the environments. Apparently, two participants withdrew through nausea (Godden and Baddeley 1975).

Godden and Baddeley wanted environments that were different for their experiment, but not completely artificial as the box with flashing lights, and Baddeley had been involved in a research project training divers before (Egstrom et al 1972).

GODDEN AND BADDELEY (1975)

Technically this article reported two similar experiments, of which experiment 1 is the more important. The aim was to compare learning and recall on land and underwater in four conditions:

- DD - learn dry (on land)/recall dry
- DW - learn dry/recall wet (underwater)
- WW - learn wet/recall wet

- WD - learn wet/recall dry

The context-dependent memory effect would predict better recall in the same environments (ie conditions DD and WW).

Experiment 1

Eighteen volunteers (13 male and five female) from a university diving club who were on a diving holiday were used in this repeated measures experiment. The experiment took place at a lake in Scotland.

Five lists of 36 unrelated two- or three-syllable words chosen at random were read on to audiotape. To co-ordinate with breathing in SCUBA apparatus, and avoid hearing problems, the words were read in blocks of three, with two seconds between each word, and four seconds between each block.

Each condition took place on a separate day and the participants were randomised in their order of conditions. One list was used per condition, and it was read twice to the participant, then there was a short distraction task with numbers, and a four minute gap before recall.

In the dry environment (D), participants sat on the water's edge with the SCUBA apparatus on their backs but not being used. In the wet environment (W), they dived to 20 feet, and Diver Underwater Communication (DUC) was used. Participants wrote down their answers with special pens that work underwater.

Recall was significantly better when in the same environment as learning (table 1).

| LEARNING WORDS: | RECALL WORDS: | | SIGNIFICANCE |
|-----------------|---------------|------|--------------|
| | DRY | WET | |
| DRY | 13.5 | 8.6 | p<0.005 |
| WET | 8.4 | 11.4 | p<0.025 |

(After Godden and Baddeley 1975)

Table 1 - Mean number of words recalled (out of 36).

Godden and Baddeley admitted to the following problems with the experiment:

i) The experiment was dependent on the good will of the divers on a pleasure-diving holiday, and the time of day and location for each condition was under their control;

ii) The wet environment conditions were dependent on

equipment and health of the divers. This also produced variations within and between participants. For example, one diver was nearly hit by an army craft during the wet condition and it had to be stopped;

iii) There was no control over cheating in the WW condition. Here the participants could have started recall before waiting four minutes. Godden and Baddeley did not feel this was a real problem because the mean recall in WW was not higher than DD;

iv) The four minute delay between learning and recall, which allowed divers to change environments, was unfilled for those staying in the same environment and could have been used for rehearsal. This problem led to experiment 2.

Experiment 2

This was the same as experiment 1 but with an extra DD condition. In this extra condition, in the four minutes between learning and recall on land, the participants had to enter the water and dive to twenty feet and return. This was known as DD d (disrupted) as compared to DD n (non-disrupted) without the dive. Sixteen volunteers from the Scottish Sub-Aqua Club were used.

The mean recall for DD d was 8.69 words and 8.44 for DD n. This was not a significant difference, and so the researchers could rule out the change of environment as reducing recall, or increased rehearsal in the four minutes between learning and recall.

This is an example of where non-significant results tell the researcher as much as significant differences in experiment 1.

Godden and Baddeley concluded their research: "Recall is better if the environment of original learning is reinstated" (p330).

AFTER GOODDEN AND BADDELEY (1975)

More straightforward research since Godden and Baddeley has shown context-dependent memory in the same room with the same furniture and same experimenter (eg Smith 1979).

The research on context-dependent memory tended to test free recall. The effect does not seem to apply to recognition, according to subsequent research by Godden and Baddeley (1980).

Context reinstatement is a technique derived from

Godden and Baddeley's (1975) experiments, and is commonly used with eye witnesses including the re-enactment of crimes.

From a different point of view, state-dependent memory has been explored. Whereas context-dependent memory is the external cue to recall, state-dependent memory is the internal cue. In other words, learning and recall in the same mood (eg Bower 1981 and happy/sad).

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Kevin Brewer

Article written February 2008

COMPARISON OF THREE DIFFERENT TYPES OF TREATMENT FOR ADOLESCENT ANOREXIA NERVOSA: EVALUATION OF A RANDOMISED CONTROLLED TRIAL

INTRODUCTION

Any therapy or treatment needs to be assessed for its effectiveness or efficacy. Clinical trials allow this to be done. Hill (1955) defined a clinical trial as "a carefully and ethically designed experiment with the aim of answering some precisely framed question". The best type of clinical trials are randomised controlled trials (RCT).

RCT are closest to "true" experiments. There are three criteria of "true" experiments (Brewer 2002):

i) The random assignment of the participants to the conditions (known as randomisation);

ii) Standardised procedures in all conditions, except for the independent variable;

iii) Control over the variables in the experiment.

GOWERS ET AL (2007)

Gowers et al (2007) reported details of the Treatment Outcome for Children and Adolescent Anorexia Nervosa (TOuCAN) which compared intensive in-patient, specialist out-patient, and community treatment. The researchers were looking at clinical effectiveness, but also cost-effectiveness and user satisfaction (the latter two reported elsewhere) ¹.

Gowers et al was a multicentre randomised controlled trial. This is a RCT performed over different centres.

Background

Anorexia nervosa is an eating disorder based around the refusal to maintain "minimally normal" body weight. This is the main diagnostic criteria of DSM-IV (APA 1994) ². The other key criteria are an intense fear of gaining weight despite being underweight, and disturbances in the way body shape and weight are experienced. There is a

¹ eg Byford et al (2007). This study estimated that over two years specialist out-patient treatment had a mean cost of £26 738. In-patient treatment cost £34 531 and general out-patient treatment cost £40 794.

² DSM-IV is the book that contains diagnostic criteria for mental disorders as produced by the American Psychiatric Association.

restricting subtype (not eating) and a binge eating/purge subtype (eating large amounts and then removing the weight gain eg excessive vomiting).

Gowers et al felt there was a "shortage of high-quality, adequately-powered treatment trials for anorexia nervosa" in the UK.

Hypotheses

- a) In-patient treatment would be more effective than out-patient treatment.
- b) Out-patient treatment would be more effective than general child and adolescent mental health service (CAMHS) treatment.

Participants

The participants were recruited in north-west England (the Manchester and Liverpool areas) through recommendations from thirty-five community CAMHS. The inclusion criteria included aged 12-18 years, and a modified DSM-IV diagnosis of anorexia nervosa (eg weight below 85% of expected for age and height; intense fear of gaining weight or shape).

Three and forty-seven individuals were assessed for eligibility by clinical interview between 2000 and 2003, and 167 started the trial (80 from the Manchester area and 87 from the Liverpool area). Less participants adhered fully and completed the trial.

Groups

The participants were randomised into one of three groups:

- i) In-patient psychiatric treatment (4 services) lasting six weeks (or longer if necessary);
- ii) Specialised out-patient treatment (2 services) over six months including individual cognitive-behaviour therapy (CBT) ³, parental counselling with patients, and dieting therapy (information about food);
- iii) General community CAMHS treatment (35 services) providing usual treatment over six months based around multidisciplinary family support.

³ CBT focuses upon the individual's maladaptive thinking patterns that underlie mental disorders.

Measures

For each questionnaire, there were baseline measures taken and at follow-up one and two years later.

i) Morgan-Russell Average Outcome Scale (MRAOS)(Morgan and Hayward 1988) - severity measure of anorexia nervosa (0-12) based around areas like food intake, menstrual state, and mental state, and used by an interviewer (table 1);

| | | | | |
|--|-------------------------|---------------------|-------------------------|-----|
| "Are you restricting your diet, or have you done so at any time in the last six months?" | | | | |
| "Have you been worried about your weight or your appearance in any other way, at any time in the last six months?" | | | | |
| SCORING | | | | |
| At any time | More than half the time | About half the time | Less than half the time | Nil |
| 0 | 3 | 6 | 9 | 12 |

(After Morgan and Hayward 1988)

Table 1 - Examples of questions on MRAOS.

ii) Health of the Nation Outcome Scales for Children and Adolescents (HoNOSCA)(Gowers et al 1999) - clinician-rated measure using thirteen items (eg peer relationships; hallucinations and delusions; family life and relationships; disruptive behaviour/aggression), and a self-rated version (HoNOSCA-SR)(Gowers et al 2002);

iii) Eating Disorders Inventory-2 (EDI-2)(Garner 1991) - self-rating questionnaire covering twelve areas including cognitions about eating, and eating behaviour;

iv) Family Assessment Device (FAD)(Epstein et al 1983) - self-rated questionnaire about family behaviour;

v) Mood and Feelings Questionnaire (MFQ)(Angold et al 1995) - forty-two item self-rating for depression.

Results

A good outcome was defined as weight above 85% of expected, return of menstruation, and binge/purging no

greater than once per month. Table 2 summarises the findings. There were no significant differences between conditions on good outcome versus the rest at one year and two years follow-up using simple X2 test ⁴.

| <u>Type of Treatment</u> | <u>After 1 year</u> | <u>After 2 years</u> |
|--------------------------|---------------------|----------------------|
| In-patients (n = 28) | 3 (11) | 6 (21) |
| Out-patients (n = 41) | 8 (20) | 11 (27) |
| CAMHS (n = 38) | 8 (21) | 15 (39) |

(After Gowers et al 2007)

Table 2 - Number (%) of adherers to each treatment rated as good outcome on follow-ups.

Conclusion

"Contrary to our hypotheses, there was no advantage for specialist over general treatment, CAMHS treatment or in-patient over out-patient management" (Gowers et al 2007 p433).

Evaluation

1. The questionnaires were filled out face-to-face in the participant's home by the interviewer who did not know details about the participant (eg which treatment group). If the participant declined an interview, the information was collected (with consent) from a family member or health professional. Telephone interviews were necessary for 24% at year 2 follow-up.

Any interview involves issues around the interaction between interviewer and interviewee, and the honesty of replies (table 3).

2. The sample was opportunity (ie those available): eg 92% were female; 76% experienced the restricting subtype of anorexia nervosa and the others, the binge purging subtype; 62.3% lived with both biological parents and the remainder with a single parent (19.2% mother and 3.6% father) or in a stepfamily situation. The researchers reported no significant difference in the demographic characteristics of the samples from the Manchester and

⁴ X2 = 1.35 and 2.76; df = 2; my analysis

| <u>Issues</u> | <u>Details</u> |
|--------------------------|--|
| Social desirability bias | Tendency to give acceptable answer to questions. |
| Evaluation cues | Interviewee aware of how their responses will be interpreted by the interviewer, and look for signs eg facial expressions. |
| Honesty of answers | Lie; memory error; misunderstanding of question. |

Table 3 - Issues in the interviewer-interviewee interaction.

Liverpool area.

With an opportunity sample, there are problems in relation to generalising the results to a wider population (table 4).

| <u>Sampling Technique</u> | <u>Advantage</u> | <u>Disadvantage</u> |
|---------------------------|---------------------------------------|-----------------------------------|
| Random sample | Easy to sample | No guarantee of representative |
| Opportunity sample | Convenient | Limited choice |
| Volunteer sample | Overcomes ethical concerns of consent | Not typical of general population |
| Purposive sample | Cross-section of population | Difficult to achieve |

Table 4 - Main types of sampling.

3. The sample size of any trial is hampered not only by those available, but those who finish the study. One hundred and eighty individuals were excluded before the study started, of which the majority failed to meet the diagnostic criteria ($n = 98$) and thirty-one refused to take part.

Overall adherence to treatment was 65%, but this varied between conditions. For in-patients, adherence was 49.1% because some individuals achieved small weight gains in a short time and then left before six weeks.

Out-patient adherence was 74.5% for attendance at half the sessions, and 69.1% adherence for CAMHS treatment.

Participant drop-out limited the follow-up data to 164 people at one year and 160 at two years. The researchers saw this as high.

4. Issues were raised in the discussion section of the report by the authors to explain the lack of significant differences between the conditions:

a) In-patient services "not truly specialised" as not exclusively eating disorders services, but experienced in eating disorders;

b) In-patient group were marginally thinner than the others;

c) Could not control for motivation of participants to improve weight or "family resources" (eg support, parental motivation);

d) A high threshold for assigning recovery.

5. The study was larger than previous ones, and focused on one particular area of the country over three years. It included 79% of cases of anorexia nervosa known to CAMHS in north-west England.

Anorexia nervosa can be a secretive condition, and so the number of cases unknown to authorities is difficult to estimate.

6. Problems with use of psychometric questionnaires. These depend upon their design for reliability and validity as well as standardisation.

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